

Appendix B

Tobamovirus Helicase

1
 TMV-KR QQMSSIVYTGPIKVQQMKNFIDSLVASLSAAVSNLVKILKDTAAIDLETR
 TMV-RAK QQMSSIVYTGPIKVQQMKNFIDSLVASLSAAVSNLVKILKDTAAIDLETR
 TMV-vu1 QQMSSIVYTGPIKVQQMKNFIDSLVASLSAAVSNLVKILKDTAAIDLETR
 TOMV QQMCSIYVTGPKLVQQMKNFIDSLVASLSAAVSNLVKILKDTAAIDLETR
 PMMV QQMHAMVYTGPKLVQQCKNYLDLSVASLSAAVSNLKKI IKDTAAIDLETK
 TMGMV QQMASVVYTGSLKVQQMKNYVDSLAAVSLSATVSNLCKSLKDEVGYDSDSR
 TMV-OB NKMASIYVSGPLQVQQMQNYVDSLAAVSLSATVSNLCKLVKDSSVGFQDSL
 ORSV KSMSSAVYTGPKLVQQMKNYMDYLSASISATVSNLCKVLKDVYGVDPESA
 TVCV GTMMSAVYTGSIKVQQMKNYIDYLSASLAATVSNLCKVLRDVHGVDPESQ
 CR-TMV GTMMSAVYTGSIQVQQMKNYIDYLSASLSATVSNLCKVLRDVHGVDPESQ
 RMV-SH GAMMSAVYTGKIKVQQMKNYVDYLSASLSATVSNLCKVLRDVHGVDPESQ
 CRMV GAMMSAVYTGKIKVQQMKNYVDYLSASLSATVSNLCKVLRDVHGVDPESQ
 TMV-CG GAMMSAVYTGKIKVQQMKNYVDYLSASLSATVSNLCKVLRDVHGVDSQS
 CGMMV KTITPVVYTGITIRERQMKNYIDYLSASLGSTLGNLERIVRSDWNGTEESM
 CGMMV-W KTITPVVYTGITIRERQMKNYIDYLSASLGSTLGNLERIVRSDWNGTEESM
 CFMMV KTITPVIYTGPIRVQRMANLYDYSANLAATIGILERIVRSNWSGN-EVV
 YCGMMV KSITPVIYTGPIRVQRMANLYDYSASLTATIGNLERIVSSWTGENELV
 SHMV QKPVNIVYTGEVQICQMKNYLDYLSASLVACISNLKKYLQDQWLNPGKEF

51
 TMV KR QKFGVLDVASRKWLIKPTAKSHAWGVVETHARKYHVALLEYDE-QGVVTC
 TMV-RAK QKFGVLDVASRKWLIKPTAKSHAWGVVETHARKYHVALLEYDE-QGIVTC
 P03586 TMV QKFGVLDVASRKWLIKPTAKSHAWGVVETHARKYHVALLEYDE-QGVVTC
 TOMV QKFGVLDVASKRWLVKPSAKNHAWGVVETHARKYHVALLEHDE-FGIITC
 PPMV EKFGVYDVCLKKWLVKPLSKGHAWGVVMDSDYKCFVALLTYDG-ENIVCG
 TMGMV EKVGVWDVTLKKWLLKPAAGHSGVGVLDYKGMFTALLSYEG-DRMVTE
 TMV OB SKVGVFVDRKKMWLIKPTLKNHSGVGVQKFDGKCFALLSYHN-ELPICD
 ORSV EKSGVYDVVGKWI IKPKDKCHAWGVADLNNGEKVIVLLEWAD-GFPIC-
 TVCV EKSGVWDVRRGRWLLKPNKCHAWGVAEDANHKLVIIVLLNWDD-GKPVCD
 CR-TMV EKSGVWDVRRGRWLLKPNKCHAWGVAEDANHKLVIIVLLNWDD-GKPVCD
 RMV-SH EKSGVWDVRRGRWLLKPNKCHAWGVAEDANHKLVIIVLLNWDE-GNPVCD
 CRMV EKSGVWDVRRGRWLLKPNKCHAWGVAEDANHKLVIIVLLNWDE-GKPVCD
 TMV-CG EKSGVWDVRRGRWLLKPNKCHAWGVAEDANHKLVIIVLLNWDE-GKPVCD
 CGMMV QTFGLYDCEKCKWLLLPAEKKHAWAVVLASDDTTRIIFLSYDESGSPIID
 CGMMV-W QTFGLYDCEKCKWLLLPAEKKHAWAVVLASDDTTRIIFLSYDESGSPIID
 CFMMV QTYGLFDCQANKWILLPSEKTHSWGVCCLTMDDKLRLVLLQYDSAGWPID
 YCGMMV QTYGLFDCQADKWILQPTERTHSWGVCCLTMDDKLRLVLLQYDEFDWPID
 SHMV QKIGVWDNLNNKWIIVPQKKKYAWGLAADVDGNQKTIVILNYDEHGMPILE

101
 TMV KR -DNWRRVAVSSESVMYSDMAKLRTLRLRLRNGEPHVSSAKVVLVDGVP GC
 TMV-RAK -DDWRRVAVSSESVMYSDMAKLRTLRLRLRNGEPHVSSAKVVLVDGVP GC
 P03586 TMV -DDWRRVAVSSESVMYSDMAKLRTLRLRLRNGEPHVSSAKVVLVDGVP GC
 TOMV -DNWRRVAVSSESVMYSDMAKLRTLRLRLKDGEPHVSSAKVVLVDGVP GC
 PPMV -ETWRRVAVSSESLVYSDMGKIRAIRSVLKDGEPISSAKVTLVDGVP GC
 TMGMV -SDWRRVAVSSDTMVYSDIAKLQNLKTRMDGEPHEPTAKMVLVDGVP GC
 TMV OB -ADWSKVAVSNESMVYSDMAKLRLVLRKSGEMPI SVSSAKVTLVDGVP GC
 ORSV -GDWRRVAVSSDSLIYSDMGKLQTLRLCKDGEPLRMPKVTLVDGVLGC
 TVCV -ETWFRVAVSSDSLIYSDMGKLKTLTSCSPNGEPPEPNAKVILVDGVP GC
 CR-TMV -ETWFRVAVSSDSLIYSDMGKLKTLTSCSPNGEPPEPNAKVILVDGVP GC
 RMV-SH -ETWFRVAVSSDSLVYSDMGKLKTLTACCRDGEPEPTAKVVLVDGVP GC
 CRMV -ETWFRVAVSSDSLVYSDMGKLKTLTSCCRDGEPEPTAKVVLVDGVP GC
 TMV-CG -ETWFRVAVSSDSLVYSDMGKLKTLTACCRDGEPEPTAKVVLVDGVP GC
 CGMMV KKNWKRFAVCSETKVYSVIRSEVLNKE----AIVDPGVHITLVDGVP GC
 CGMMV-W KKNWKRFAVCSETKVYSVIRSEVLNKE----AIVDPGVHITLVDGVP GC
 CFMMV KSFWKAFVCADTKVFSVIRSEVLNKE----PLVEPDAKYVLIDGVP GC

YCGMMV KSSWKAFCVSADTKVFSIIRSLEVLSSL----PLSDPTAKFTLIDGVPGC
 SHMV -KSYVRLVSTDTYLFVTVVSMGLYLRHL-----DQKKPTATITLVDGVPGC

151

TMV KR GKTKEILSRVNFDEDLILVPGKQAAEMIRRRANS-SGIIIVATKDNVKTVD
 TMV-RAK GKTKEILSRVNFDEDLILVPGKQAAEMIRRRANS-SGIIIVATKDNVRTVD
 P03586 TMVGKTKEILSRVNFDEDLILVPGKQAAEMIRRRANS-SGIIIVATKDNVKTVD
 TOMV GKTKEILSRVNFDEDLILVPGRQAAEMIRRRANA-SGIIIVATKDNVRTVD
 PPMV GKTKEILSRVNFDEDLILVPGKQAAEMIRRRANS-SGLIVATKENVRTVD
 TMGMV GKYKGFERFDLDEDLILVPGKQAAAMIRRRANS-SGLIRATMDNVRTVD
 TMV OB GKTKEILRRVNFSEDLVLVPGKEAAAMIRKRAHQ-SGNIVANNDNVKTVD
 ORSV GKTKEILETVNFDEELILVPGKEACKMI IKRANK-SGHVRATKDNVRTVD
 TVCV GKTKEIIEKVNFEEDLILVPGKEASKMI IRRANQ-AGVIRADKDNVRTVD
 CR-TMV GKTKEIIEKVNFEEDLILVPGKEASKMI IRRANH-AGVIRADKDNVSTVD
 RMV-SH GKTKEILEKVNFEEDLVLVPGKEASKMI IRRANQ-AGVTRADKDNVRTVD
 CRMV GKTKEILEKVNFEEDLVLVPGKEASKMI IRRANQ-AGITRADKDNVRTVD
 TMV-CG GKTKEILEKVNFEEDLVLVPGKEASKMI IRRANQ-AGIIRADKDNVRTVD
 CGMMV GKTAELIARVNWKTDLVLTGREAAMIRRRACALHKS PVATNDNVRTFD
 CGMMV-W GKTAELIARVNWKTDLVLTGREAAMIRRRACALHKS PVATNDNVRTFD
 CFMMV GKTQEIISSADFKTDLILT PGKEAAAMIRRRANMKYRSPVATNDNVRTFD
 YCGMMV GKTQEIIINSADFKTDLILT PGKESAAMIRRRANAKFRGC VATNDNVRTFD
 SHMV GKTQEILSRFDANS DLILVQGREACEMIRRRAND-NVPGSATKENVRTFD

201

TMV KR SFMMNFGKSTRCQFKRLFIDEGLMLHTGCVNFLVMSLCEIAYVYGD TQQ
 TMV-RAK SFMMNFGKSTRCQFKRLFIDEGLMLHTGCVNFLVMSLCEIAYVYGD TQQ
 P03586 TMVSFMMNFGKSTRCQFKRLFIDEGLMLHTGCVNFLVMSLCEIAYVYGD TQQ
 TOMV SFLMNYGKGARCFKRLFIDEGLMLHTGCVNFLVMSLCEIAYVYGD TQQ
 PPMV SFLMNYGRGP-CQYKRLFIDEGLMLHPGCVNFLVMSLCEIAYVYGD TQQ
 TMGMV SLLMH---PKPRSHKRLFIDEGLMLHTGCVNFLVLISGCDIAYIYGD TQQ
 TMV OB SFLMNLGKGPVCQFKRLFVDEGLMLHPGCVYFLVKLSLCEAFVFGD TQQ
 ORSV SFLMH---LKPPTYNKLFI DEGLMLHTGCVNFLIALSHCREAMVFGD TEQ
 TVCV SFLMH---PSRRVFKRLFIDEGLMLHTGCVNFLLLLSQCDVAYVYGD TKQ
 CR-TMV SFLMH---PSRRVFKRLFIDEGLMLHTGCVNFLLLLSQCDVAYVYGD TQQ
 RMV-SH SFLMH---PPKRVFKRLFIDEGLMLHTGCVNFLTLLSHCDVAYVYGD TQQ
 CRMV SFLMH---PPKRVFKRLFIDEGLMLHTGCVNFLTLLSHCDVAYVYVD TQQ
 TMV-CG SFLMH---PPKREFKRLFIDEGLMLHTGCVNFLTLLSHCEVAYVYGD TQQ
 CGMMV SFVMN---RKIFKFDVAYVDEGLMVHTGLLNFALKISGCKKAFVFGD AKQ
 CGMMV-W SFVMN---RKIFKFDVAYVDEGLMVHTGLLNFALKISGCKKAFVFGD AKQ
 CFMMV SFVMN---KKPFTFKTLWVDEGLMVHTGLLNFCVNI AKVKEVRIFGD TKQ
 YCGMMV SFVMN---KKPFTFKTLWVDEGLMVHTGLLNFCVNI AKVKEVKIFGD TKQ
 SHMV SFVMN---RKPGKFKTLWVDEGLMVHPGLINFCINISCVSSVYIFGD RKQ

251

TMV KR IPYINRVSGFPYP AHFAKLEVDEVETRRTTLRCPADVTHYLNRRYEGFVM
 TMV-RAK IPYINRVSGFPYP AHFSKLEVDEVETRRTTLRCPADVTHYLNRRYEGFV
 P03586 TMVIPYINRVSGFPYP AHFAKLEVDEVETRRTTLRCPADVTHYLNRRYEGFVM
 TOMV IPYINRVTFGPYP AHFAKLEVDEVETRRTTLRCPADVTHFLNQRYEGHVM
 PPMV IPYINRVATFPYPKHLSQLEVDVETRRTTLRCPADITFFLNQKYEGQVM
 TMGMV IPFINRVQNFPPYPKHFEKLQVDEVEMRRTTLRCPGDVNFLLQSKYEGAVT
 TMV OB IPYINRVQNFPPYPKHFEKLQVDEVETKRRTTLRCPVDVTHFLNQCYDGAVT
 ORSV IPFINRVANFPYPKHFGHTCLHRREVRRLSLRCPADVTHFMNSKYDGKFL
 TVCV IPFICRVANFPYP AHFAKLVADEKEVRRVTLRCPADVTYFLNKKYDGAVM
 CR-TMV IPFICRVANFPYP AHFAKLVADEKEVRRVTLRCPADVTYFLNKKYDGAVM
 RMV-SH IPFICRVANFPYP SHFAKLVDKEDRRVTLRCPADVTYFLNTRYDGSVM
 CRMV IPFICRVANFPYP AHFAKLVDKEDRRVTLRCPADVTYFLNQKYDGSVL
 TMV-CG IPFICRVANFPYPKHFAKLVDKEDRRVTLRCPADVTFFLNKKYDGAVL
 CGMMV IPFINRVMNFDYPKELRTLIVDNVERRYVTHRCPRDVT SFLNTIYKAAVA
 CGMMV-W IPFINRVMNFDYPKELRTLIVDNVERRYVTHRCPRDVT SFLNTIYKAAVA
 CFMMV IPFINRVMNFDYPLELRKIIVDTVEKRYTSKRCPRDVTHYLNVEYSSPVC

YCGMMV IPFINRVMNFDYPLELKKIIVDDVEKRYTSKRCPRDVTHYLNEVYAAPVT
 SHMV IPFINRVMNFSIPDNLAKLYYDEIVSRDITTKRCPLDVTHFLNSVYEKRV

301

TMV KR STSSVKKSVSQEMVGGAAVINP-ISKPLHGKILFTTQSDKEALLSRGYS-
 TMV-RAK STSSVKKSVSQEMVGGAAVINP-ISKPLHGKILFTTQSDKEALLSRGYS-
 P03586 TMVSTSSVKKSVSQEMVGGAAVINP-ISKPLHGKILFTTQSDKEALLSRGYS-
 TOMV CTSSEKKSVSQEMVSGAASINP-VSKPLKGKILFTTQSDKEALLSRGYA-
 PPMV CTSSVTRSVSHEVIQGAAMNP-VSKPLKGKIVFTTQSDKSLLSRGYE-
 TMGMV TTSTVQRSVSSEMIGGKGVLSN-VSKPLKGKIVFTTQADKFELEEKGYK-
 TMV OB TTSKTQRSVGLVVGGAAMNP-VTKPLKGKIVFTTQSDKLTMLSRGYQ-
 ORSV CTNDVIRSVDAEVVRGKGVFNP-KSKPLKGKIIFTTQSDKAELENERGYEE
 TVCV CTSAVERSVAEVRGKGALNP-ITLPLEGKILFTTQADKFELLEKGYK-
 CR-TMV CTSAVERSVAEVRGKGALNP-ITLPLEGKILFTTQADKFELLEKGYK-
 RMV-SH CTSSVERSVAEVRGKGALNP-ITLPLEGKILFTTQADKFELLDKGYK-
 CRMV CTSSVERSVAEVRGKGALNP-ITLPLEGKILFTTQADKFELLDKGYK-
 TMV-CG CTSSVERSVAEVRGKGALNP-ITLPLEGKILFTTQADKFELLDKGYK-
 CGMMV TTSPVHVSVAIKVSGAGILRP-ELTKIKGKIIFTTQSDKQSLIKSGYN-
 CGMMV-W TTSPVHVSVAIKVSGAGILRP-ELTKIKGKIIFTTQSDKQSLIKSGYN-
 CFMMV TTSPVHVSVTKKIAGVGLLRP-ELTALPGKIIFTTQNDKQTLKAGYA-
 YCGMMV TSSAVVHVSQKKIAGVGLLRP-ELTSLEGKIIFTTQSDKQTLKAGYE-
 SHMV SYSNVQRSLECKMISGKAKINDYRSILAEGKLLFTTQEDKEYLLKAGFK-

351

TMV KR -----DVHTVHEVQGETYSDVSLVRLTPTPVSI IAGDSPHVLVALSRHTC
 TMV-RAK -----EVHTVHEVQGETYSDVSLVRLTPTPISI IAGDSPHVLVALSRHTC
 P03586 TMV-----DVHTVHEVQGETYSDVSLVRLTPTPVSI IAGDSPHVLVALSRHTC
 TOMV -----DVHTVHEVQGETYADVSLVRLTPTPVSI IARDSPHVLVLSRHTK
 PPMV -----DVHTVHEVQGETFEDVSLVRLTPTPVGI ISKQSPHLLVLSRHTR
 TMGMV -----NVNTVHEIQGETFEDVSLVRLTATPLTLISKSSPHVLVALTRHTK
 TMV OB -----DVNTVHEIQGETYEEVSLVRLTPTPIHI ISRESPHVLVGLTRHTR
 ORSV VSTFGEINTVHEIQGETFEDVSVRLTPTALELISKSSPHVLVALTRHTK
 TVCV -----DVNTVHEVQGETYEKTAIVRLTSTPLEI ISSASPHVLVALTRHTT
 CR-TMV -----DVNTVHEVQGETYEKTAIVRLTSTPLEI ISRASPHVLVALTRHTT
 RMV-SH -----DVNTVHEVQGETYEKTAIVRLTATPLEI ISRASPHVLVALTRHTT
 CRMV -----DVNTVHEVQGETYEKTAIVRLTATPLEI ISRASPHVLVALTRHTT
 TMV-CG -----DVNTVHEVQGETYEKTAIVRLTATPLEI ISRASPHVLVALTRHTT
 CGMMV -----DVNTVHEIQGETFEETAVVRATPTPIGLIARDSPHVLVALTRHTK
 CGMMV-W -----DVNTVHEIQGETFEETAVVRATPTPIGLIARDSPHVLVALTRHTK
 CFMMV -----DVNTVHEVQGETYEETS VVRATATPIGLISRKSPHVLVALSRHTK
 YCGMMV -----DVNTVHEVQGETYEECTSVVRATATPIGLISRKSPHVLVALSRHTK
 SHMV -----DVNTVHEAQGETYRDVNLRVTATPLTIVSAGSPHVTVALSRHTN

401

TMV KR SLKYYTVVMDPLVSIIRDLEKLSSYLDDMYKVDA
 TMV-RAK SLKYYTVVMDPLVSIIRDLEKLSSYLDDMYKVDA
 P03586 TMVSLKYYTVVMDPLVSIIRDLEKLSSYLDDMYKVDA
 TOMV SLKYYTVVMDPLVSIIRDLERVSSYLDDMYKVDA
 PPMV SIKYYTVVLDVAVSVLRDLECVSSYLDDMYKVDV
 TMGMV SFKYYTVVLDPLVQIISDLSSLSSFLLEMYMVEA
 TMV OB CFKYYTVVLDPLVKVLRDLECVSNFLLDVYMVDS
 ORSV SFKYYCVVLDPLVKVCSDSLKVSDFILDMYKVDA
 TVCV CCKYYTVVLDPMVNVISEMEKLSNFLLDMYRVEA
 CR-TMV RCKYYTVVLDPMVNVISEMEKLSNFLLDMYRVEA
 RMV-SH RCKYYTVVLDPMVNVISELGKLSNFLLEMYKVES
 CRMV RCKYYTVVLDPMVNVISELGKLSNFLLEMYKVES
 TMV-CG RCKYYTVVLDPMVNVISEMEKLSNFILDDMYKVES
 CGMMV AMVYYTVVFDVAVTSIIADVEKVDQSILTMFATTV
 CGMMV-W AMVYYTVVFDVAVTSIIADVEKVDQSILTMFATTV
 CFMMV AMTYYTVTVDPVSCI IADLEKVDQSILSMYASVA

YCGMMV	TMTYYTVTVDPVSCIIADLEKVDQSILSMYATVA
SHMV	RFVYYTVVPDVVMTTVQKTQCVSNFLDMYAVAY

[Return to Home Page](#)

Last Updated: Thur., May 31, 2001